

WHAT IS CLAIMED IS:

1. A method of forming a metal line layer in a semiconductor device, comprising the steps of:

5 depositing a metal line layer having a plurality of conductive layers on a semiconductor structure;

depositing and patterning a photosensitive material on the metal line layer;

etching at least one conductive layer of the plurality of conductive layers using the photosensitive material as a mask;

10 forming a side wall oxide film on a side wall of the at least one conductive layer of the etched conductive layers; and

etching the non-etched conductive layer of the conductive layers constituting the metal line layer.

15 2. A method of forming a metal line layer in a semiconductor device according to claim 1, wherein at least one of the conductive layers is made of aluminum (Al).

20 3. A method of forming a metal line layer in a semiconductor device according to claim 2, wherein the metal line layer is formed by laminating a first Ti/ TiN layer, an Al layer and a second Ti/TiN layer in this order, the side wall oxide film is an Al<sub>2</sub>O<sub>3</sub> film, and the non-etched conductive layers are the first Ti/ TiN layer which is a lowermost layer.

4. A method of forming a metal line layer in a semiconductor device according to claim 3, wherein the Ti/ TiN layers are dry-etched using activated plasma comprising  $\text{Cl}_2/\text{BCl}_3/\text{N}_2$  gas.
- 5            5. A method of forming a metal line layer in a semiconductor device according to claim 1, wherein an insulating film as a hard mask is further formed between an uppermost layer of the metal line layer and the photosensitive material.
- 10           6. A method of forming a metal line layer in a semiconductor device according to claim 5, wherein the insulating film is a nitride film, and the metal line layer is formed by laminating a first Ti/TiN layer, an Al layer and a second Ti/TiN layer in this order.
- 15           7. A method of forming a metal line layer in a semiconductor device according to claim 5, wherein the insulating film is etched by means of a dry etching process using activated plasma comprising a combination of  $\text{CHF}_3/\text{CF}_4/\text{Ar}$  or  $\text{C}_x\text{F}_y$  (where x, y are natural numbers)/  $\text{O}_2/\text{Ar}$  gas.
- 20           8. A method of forming a metal line layer in a semiconductor device according to 1, wherein an uppermost layer of the semiconductor structure is formed out of an oxide film.